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EXPERIMENT IN ALTERNATIVE ENERGY

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Pattiyapola, a small village in the heart of Sri Lanka's southern dry zone, is far removed from city life. You drive out from the nearest town, Tangalle, through the Sri Lankan countryside. The trees here in the dry zone are green, but they have a fine coating of dust. Cattle cross the road and iguanas slither away as you pass. In the fields, cranes balance on one foot and kingfishers take off in a patch of blue. Paddy birds hop across the fields.

The waters of the Pattiyapola tank (part of an ancient system of man-made reservoirs) glisten in the sun. And the banyan trees on its banks conserve the coolness that the waters give. For half the year the tank goes dry. But still bountiful nature provides enough firewood for cooking.

Until quite recently, the village had never known electricity, an amenity that urban dwellers have taken for granted for several decades. It is in this setting that a modern experiment in the generation of alternative sources of energy is going on. Advanced space technology in the form of photovoltaic solar cells has come to Pattiyapola.

Pattiyapola is the site of the Rural Energy Centre, run by the Electricity Board of Sri Lanka, and financed by the United Nations Environment Programme (UNEP). This community-based, pilot project is

attempting to use a number of renewable energy resources to generate electricity. It is also trying out new mechanisms to conserve and store that energy. Dr. I.H. Usmani, Senior Adviser to the Centre for Natural Resources, Energy and Transport of the United Nations, is the brain behind this experiment.

The Rural Energy Centre harnesses biogas, wind, and solar energy for the generation of electricity. Its modest capacity of 50 kilowatts is suited to small-scale village consumption, and is sufficient to provide electricity to meet basic needs, other than cooking, for three to six hours a day. Once the project is completed, it will be adequate to meet the needs of 200 households -- about 1800 people. The electricity will be used mainly for lighting and for pumping water for irrigation and drinking.

The first things you see as you drive up to the project area are the windmills and a huge aluminium-coloured upturned umbrella. It is the concentrating solar collector, a big concave mirror that tracks the sun and focuses its radiation on one spot. Further on is the black inverted cap of the biogas digester, 22 feet in diameter. Further still is the sloping, table-like assemblage of solar cells. There are 70 panels over a 350 square foot area.

But why Pattiyapola? According to project engineer, B.P. Sepalage, of the Electricity Board, the village has an abundance of raw materials in continuous supply. Wind and sunlight are free of course, and cowdung for the biogas digester is cheap.

The wind regime in Pattiyapola is fairly strong. It was possible to study it because it has been recorded by a nearby meteorological observatory for the last 50 years. So the windmills can be kept turning most of the year. When the sun and the wind fail, the Centre can always fall back on biogas

for the generation of electricity.

There are about 2000 head of cattle in this predominantly agricultural community. The dung of some 200 cattle is needed each day to feed the biogas digester. In all, 2000-4000 pounds of organic matter -- dung or vegetable matter -- has to be fed into the digester. Water hyacinth and salvinia, which are plentiful in the village, are ideal to keep the digester going.

The community-size biogas digester is of Indian design. It can generate 3000 cubic feet of biogas per day, the equivalent of 90 kilowatt hours of electricity. The biogas fires two generators to produce electricity. The engines were originally oil-fired, but they have been modified by Electricity Board engineers.

Pattiyapola has wide expenses of paddy fields. They could well use the rich fertiliser that is a by-product of biogas generation. Just to prove its point, the Centre has cultivated two and a half acres of paddy and fertilised then with the residual manure. These plots are lusher and greener than the surrounding paddy fields, and are the envy of the farmers.

The 70 solar panels are capable of generating two kilowatts of electricity at peak. Solar energy is expensive. Each panel cost Rs 6000, or close to US$ 1000. But when solar cells were first used in space technology they would have cost one lakh of rupees or more (about $7600). Dr. Usmani makes the point that when the solar cells are mass-produced, the costs are bound to come down even further due to economies of scale and improvement in technology.

The solar cells are simplicity itself to maintain. There are no moving parts and there is no question of transporting spare parts through remote and difficult terrain, making them suitable for rural areas. All you have to do is wash the panels every month with cold water. They have

a life-span of 20 years.

The solar concentrating collector tracks the sun, and focuses its radiation on a boiler that can raise steam to power a steam engine to generate 7.5 kilowatts of electricity per day.

The windmills, well-tried models manufactured in Australia, are topped by generators.

The electricity generated by each of these sources will be stored in a battery tank that can store 150 kilowatts of energy. Since most of the electricity is generated in the day-time, storing it for night-time is necessary. When there is no sun or wind the stored electricity can be used. The battery tank has four days supply for the village. The batteries themselves have a life-span of 10 years.

The whole project cost US$ 300,000, which is expensive for a developing country, but the main idea behind the pilot project is to evaluate costs, work out the viable models, and popularise the concepts.

If it proves practicable, this kind of small village scheme will come in very handy for rural electrification. It will take the load off the big hydro and thermal projects. Community-sized rural-based schemes could provide for the small and non-continuous needs of the villages. The big plants could provide unbroken supplies to the towns for lighting and cooking, for industry, communications, and other uses.

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